

DL-HW #09

2015004693_양상현

실행환경: MAC OS TERMINAL (MACBOOK PRO 2015 RETINA, MOJAVE 10.14.6), ANACONDA

1. Source Code:

- Assignment9 폴더 참조 (DL_HW_09week.py)

9주차 실습 수업 자료 마지막 부분에 있는 Skeleton code의 비어있는 일부분을 편집하여 완성하였다. RNN구조를 설계하는 부분을 편집했는데, CELL은 BasicLSTMCELL을 이용하여 구현했고, output은 dynamic_rnn을 이용하여 구현하였다. State는 무시하고 사용하지 않았다.

```
#=====HW=====#  
  
X = tf.placeholder(tf.int32, [None, sequence_length])  
Y = tf.placeholder(tf.int32, [None, sequence_length])  
  
X_one_hot = tf.one_hot(X, num_classes)  
  
cell = tf.contrib.rnn.BasicLSTMCell (num_units = hidden_size)  
  
outputs, _state = tf.nn.dynamic_rnn(cell, X_one_hot, dtype = tf.float32)  
  
#=====#
```

2. Result:

- 실행결과 (01) (DL_HW_09week.py)

```
assignment9 --bash-- 96x53  
read pool with default inter op setting: 4. Tune using inter_op_parallelism_threads for best performance.  
0 loss: 2.2887015 Prediction: y y y y o o o o o o o o o o o  
1 loss: 2.1313848 Prediction: y y y o  
2 loss: 2.0048323 Prediction: y y o y o u u u u o o y u u  
3 loss: 1.8597338 Prediction: y y y u u a n y u u  
4 loss: 1.6429062 Prediction: y y y u u a n y o u  
5 loss: 1.4455566 Prediction: y y y o u a n y o u  
6 loss: 1.1988417 Prediction: y y y o u a n y o u  
7 loss: 0.94195205 Prediction: y y y o u a n t y o u  
8 loss: 0.722367 Prediction: y f y o u w a n t y o u  
9 loss: 0.5331832 Prediction: y f y o u w a n t y o u  
10 loss: 0.36468127 Prediction: y f y o u w a n t y o u  
11 loss: 0.25439832 Prediction: i f y o u w a n t y o u  
12 loss: 0.17872034 Prediction: i f y o u w a n t y o u  
13 loss: 0.12675658 Prediction: i f y o u w a n t y o u  
14 loss: 0.09451549 Prediction: i f y o u w a n t y o u  
15 loss: 0.070960574 Prediction: i f y o u w a n t y o u  
16 loss: 0.05129352 Prediction: i f y o u w a n t y o u  
17 loss: 0.03570679 Prediction: i f y o u w a n t y o u  
18 loss: 0.024930362 Prediction: i f y o u w a n t y o u  
19 loss: 0.017844137 Prediction: i f y o u w a n t y o u  
20 loss: 0.013015191 Prediction: i f y o u w a n t y o u  
21 loss: 0.009624648 Prediction: i f y o u w a n t y o u  
22 loss: 0.0072302883 Prediction: i f y o u w a n t y o u  
23 loss: 0.005634318 Prediction: i f y o u w a n t y o u  
24 loss: 0.0043218974 Prediction: i f y o u w a n t y o u  
25 loss: 0.003443021 Prediction: i f y o u w a n t y o u  
26 loss: 0.002795685 Prediction: i f y o u w a n t y o u  
27 loss: 0.0023111375 Prediction: i f y o u w a n t y o u  
28 loss: 0.0019427597 Prediction: i f y o u w a n t y o u  
29 loss: 0.0016586416 Prediction: i f y o u w a n t y o u  
30 loss: 0.0014366716 Prediction: i f y o u w a n t y o u  
31 loss: 0.0012611375 Prediction: i f y o u w a n t y o u  
32 loss: 0.0011207697 Prediction: i f y o u w a n t y o u  
33 loss: 0.0010073192 Prediction: i f y o u w a n t y o u  
34 loss: 0.0009146841 Prediction: i f y o u w a n t y o u  
35 loss: 0.000838149 Prediction: i f y o u w a n t y o u  
36 loss: 0.0007740951 Prediction: i f y o u w a n t y o u  
37 loss: 0.0007196404 Prediction: i f y o u w a n t y o u  
38 loss: 0.0006734965 Prediction: i f y o u w a n t y o u  
39 loss: 0.00063322607 Prediction: i f y o u w a n t y o u  
40 loss: 0.0005978995 Prediction: i f y o u w a n t y o u  
41 loss: 0.0005667398 Prediction: i f y o u w a n t y o u  
42 loss: 0.00053902506 Prediction: i f y o u w a n t y o u  
43 loss: 0.0005143666 Prediction: i f y o u w a n t y o u  
44 loss: 0.0004923041 Prediction: i f y o u w a n t y o u  
45 loss: 0.00047263154 Prediction: i f y o u w a n t y o u  
46 loss: 0.0004501543 Prediction: i f y o u w a n t y o u  
47 loss: 0.0004393686 Prediction: i f y o u w a n t y o u  
48 loss: 0.0004253417 Prediction: i f y o u w a n t y o u  
49 loss: 0.00041276807 Prediction: i f y o u w a n t y o u  
(tensorflow) yangsangheonui-MacBook-Pro:assignment9 SangheonY$
```

- 실행결과 (02) (DL_HW_09week.py)

```

assignment9 --bash-- 96x53
read pool with default inter op setting: 4. Tune using inter_op_parallelism_threads for best performance.
0 loss: 2.291804 Prediction: y u
1 loss: 2.16576 Prediction: y y uuuu u
2 loss: 2.036651 Prediction: y y y uuu yyo you
3 loss: 1.8849584 Prediction: y y y uuu y ynooooo
4 loss: 1.6775286 Prediction: y y you wano you
5 loss: 1.4201655 Prediction: y y y uuu wano you
6 loss: 1.1238376 Prediction: y f you wann you
7 loss: 0.8522479 Prediction: y f you want you
8 loss: 0.6233265 Prediction: y f you want you
9 loss: 0.44788902 Prediction: i f you want you
10 loss: 0.30550852 Prediction: i f you want you
11 loss: 0.20171563 Prediction: i f you want you
12 loss: 0.1314382 Prediction: i f you want you
13 loss: 0.08533444 Prediction: i f you want you
14 loss: 0.05632802 Prediction: i f you want you
15 loss: 0.037825298 Prediction: i f you want you
16 loss: 0.02579595 Prediction: i f you want you
17 loss: 0.017934373 Prediction: i f you want you
18 loss: 0.012817925 Prediction: i f you want you
19 loss: 0.00945717 Prediction: i f you want you
20 loss: 0.007189897 Prediction: i f you want you
21 loss: 0.005609217 Prediction: i f you want you
22 loss: 0.0044722697 Prediction: i f you want you
23 loss: 0.003631973 Prediction: i f you want you
24 loss: 0.002996745 Prediction: i f you want you
25 loss: 0.0025079113 Prediction: i f you want you
26 loss: 0.0021265477 Prediction: i f you want you
27 loss: 0.001825976 Prediction: i f you want you
28 loss: 0.0015871787 Prediction: i f you want you
29 loss: 0.0013960963 Prediction: i f you want you
30 loss: 0.0012420663 Prediction: i f you want you
31 loss: 0.0011167382 Prediction: i f you want you
32 loss: 0.001013567 Prediction: i f you want you
33 loss: 0.0009274837 Prediction: i f you want you
34 loss: 0.00085461355 Prediction: i f you want you
35 loss: 0.0007920876 Prediction: i f you want you
36 loss: 0.000737692 Prediction: i f you want you
37 loss: 0.0006900491 Prediction: i f you want you
38 loss: 0.0006480884 Prediction: i f you want you
39 loss: 0.0006107293 Prediction: i f you want you
40 loss: 0.0005776012 Prediction: i f you want you
41 loss: 0.0005480047 Prediction: i f you want you
42 loss: 0.0005217038 Prediction: i f you want you
43 loss: 0.00049820467 Prediction: i f you want you
44 loss: 0.00047719857 Prediction: i f you want you
45 loss: 0.00045836 Prediction: i f you want you
46 loss: 0.00044152245 Prediction: i f you want you
47 loss: 0.00042634446 Prediction: i f you want you
48 loss: 0.0004127468 Prediction: i f you want you
49 loss: 0.0004004276 Prediction: i f you want you
(tensorflow) yangsangheonui-MacBook-Pro:assignment9 SangheonYS

```

- 실행결과 (03) (DL_HW_09week.py)

```

assignment9 --bash-- 96x53
read pool with default inter op setting: 4. Tune using inter_op_parallelism_threads for best performance.
0 loss: 2.294936 Prediction: y y o
1 loss: 2.1320744 Prediction: y y
2 loss: 1.9514284 Prediction: y y y o ooo yoo
3 loss: 1.7949103 Prediction: y u n you
4 loss: 1.5456625 Prediction: y u u u ant you
5 loss: 1.3302953 Prediction: y y y u u a ant you
6 loss: 1.0246495 Prediction: y y you a ant you
7 loss: 0.7823027 Prediction: y y you want you
8 loss: 0.60300344 Prediction: y f you want you
9 loss: 0.44317943 Prediction: y f you want you
10 loss: 0.32901484 Prediction: y f you want you
11 loss: 0.24486464 Prediction: y f you want you
12 loss: 0.18032305 Prediction: i f you want you
13 loss: 0.13593267 Prediction: i f you want you
14 loss: 0.10660864 Prediction: i f you want you
15 loss: 0.08579835 Prediction: i f you want you
16 loss: 0.06806155 Prediction: i f you want you
17 loss: 0.054603618 Prediction: i f you want you
18 loss: 0.04316212 Prediction: i f you want you
19 loss: 0.034362063 Prediction: i f you want you
20 loss: 0.027529124 Prediction: i f you want you
21 loss: 0.02201187 Prediction: i f you want you
22 loss: 0.017444419 Prediction: i f you want you
23 loss: 0.013685208 Prediction: i f you want you
24 loss: 0.010671477 Prediction: i f you want you
25 loss: 0.008329315 Prediction: i f you want you
26 loss: 0.006554531 Prediction: i f you want you
27 loss: 0.005229855 Prediction: i f you want you
28 loss: 0.0042454116 Prediction: i f you want you
29 loss: 0.0035105166 Prediction: i f you want you
30 loss: 0.0029559066 Prediction: i f you want you
31 loss: 0.002531282 Prediction: i f you want you
32 loss: 0.0022007853 Prediction: i f you want you
33 loss: 0.0019394421 Prediction: i f you want you
34 loss: 0.0017294881 Prediction: i f you want you
35 loss: 0.0015584585 Prediction: i f you want you
36 loss: 0.0014173192 Prediction: i f you want you
37 loss: 0.001299563 Prediction: i f you want you
38 loss: 0.0012002973 Prediction: i f you want you
39 loss: 0.001158452 Prediction: i f you want you
40 loss: 0.001043436 Prediction: i f you want you
41 loss: 0.0009808816 Prediction: i f you want you
42 loss: 0.00092643726 Prediction: i f you want you
43 loss: 0.0008788199 Prediction: i f you want you
44 loss: 0.0008368492 Prediction: i f you want you
45 loss: 0.0007996932 Prediction: i f you want you
46 loss: 0.0007664666 Prediction: i f you want you
47 loss: 0.0007370829 Prediction: i f you want you
48 loss: 0.00071051874 Prediction: i f you want you
49 loss: 0.0006865416 Prediction: i f you want you
(tensorflow) yangsangheonui-MacBook-Pro:assignment9 SangheonYS

```

3. Discussion:

< 코드 설명 >

```
#####HW#####  
X = tf.placeholder(tf.int32, [None, sequence_length])  
Y = tf.placeholder(tf.int32, [None, sequence_length])  
  
X_one_hot = tf.one_hot(X, num_classes)  
  
cell = tf.contrib.rnn.BasicLSTMCell (num_units = hidden_size)  
  
outputs, _state = tf.nn.dynamic_rnn(cell, X_one_hot , dtype = tf.float32)  
  
#####
```

기본적으로 제공된 skeleton code에서 LSTM Cell과 입출력 데이터에 관한 부분을 추가했고, LSTM Cell과 one-hot encoding 된 입력 데이터로 dynamic RNN을 이용하여 학습을 진행시켰다. 이 학습의 결과는 다음 Layer인 Fully connected Layer의 입력으로 들어가게 된다. Sequence_lenght는 "if you want you" 전체 길이에서 1을 뺀 숫자로 X의 경우 "if you want yo", Y의 경우 "if you want you"를 담기 위한 Placeholder를 만들 때 크기를 결정하는데 쓰인다. 또한 Num_classes는 각 알파벳을 개별적인 정수 숫자로 나타낸 것의 종류 갯수 이므로 one_hot 인코딩 할 때 사용하였다. 또한 dynamic_rnn으로 학습을 진행 할 때 one-hot 인코딩된 x 데이터를 사용했다.

< 결과 분석 >

"if you want you" 문장 자체가 그렇게 길지 않고, 띄어쓰기 구문을 포함한 문자의 갯수가 총 10개 밖에 되지 않기 때문에 빠르게 원하는 결과값에 도달 할 수 있었다고 생각한다. 문장의 길이가 더 길어지고 문자의 종류가 더 많아지면 학습하고 원하는 결과를 얻기까지 더 많은 시간이 걸릴 것이다.